# NOKIA 9500 Communicator

9245749
Issue 1 EN

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# Nokia 9500 Communicator
# Using WLAN

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# Introduction

The purpose of this document is to guide you in using wireless LAN (WLAN) connections with your Nokia 9500 Communicator. Typical situations in which you might use WLAN with Nokia 9500 Communicator include, but are not limited to, downloading e-mail with attachments, browsing the web and downloading files, connecting to company network, connecting to a WLAN-capable laptop computer, and sending a document to a WLAN-connected printer. WLAN connections can be used both in public situations, such as when waiting at an airport or staying at a hotel, and in private wireless networks at your office or home.

Nokia 9500 Communicator supports the following WLAN features:

- IEEE 802.11b WLAN standard
- Wi-Fi Protected Access 1.0 (WPA)
- 232-bit WEP keys
- For interoperability with older WLAN networks, Nokia 9500 Communicator also supports the legacy static WEP security and dynamic WEP security

Nokia 9500 Communicator does not support the IEEE 802.11a and IEEE 802.11g WLAN standards.

**Note:** The typical transmission range of WLAN connections is limited from 30 meters in indoor spaces to 100 meters in open spaces. The range of wireless devices can be affected by metal surfaces, solid high-density materials and obstacles in the signal path.



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# Defining WLAN connection settings

This chapter discusses the WLAN settings in Nokia 9500 Communicator. Special focus is on the selection of the WLAN security mode.

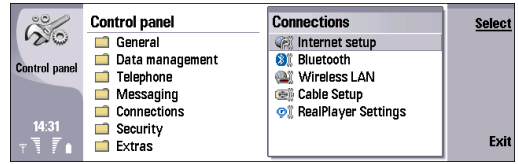
Different connectivity settings, including GPRS, WLAN and other technologies, are organized in so called Internet Access Points (IAPs) in your device. For WLAN access point usage, a WLAN IAP can be created. The advantage of using WLAN access point is that you have more control (particularly regarding security) over network traffic because it passes through the access point, and that you can use any resources in the wired network that the WLAN access point is connected to. The most important settings in the WLAN IAP include the network name (SSID), the WLAN security mode, and the security mode specific security settings.

It is not always necessary to pre-configure the IAP settings, as the user can select the Easy WLAN Internet Access Point. The Easy WLAN IAP allows the user to connect to newly discovered WLAN networks for which there is no pre-configured IAP. In WLAN access point usage, the Easy WLAN IAP can be used for connections to open networks (security mode "None") that use HTTP based logon.

It is also possible for WLAN devices to communicate directly with each other without any WLAN access points. This is done via ad hoc networks, which are established by a single user and others can then join in. Ad hoc connections are easy to set up, but they are limited to devices within the wireless transmission range. You can use ad hoc WLAN connections to print a document in your device to a compatible printer, for example.

## Creating a WLAN Internet Access Point for a WLAN access point

To create a new Internet Access Point, select **Desk**→ **Tools**→ **Control Panel**→ **Connections**→ **Internet setup**.




When the list of existing IAPs is shown, press **New** to create a new one. If there are existing IAPs, the setup asks



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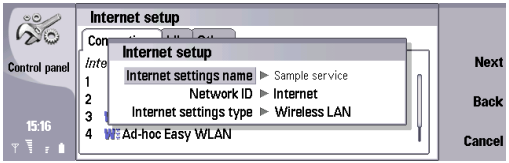
you if you want to use of of them as a basis for the new IAP.

1 Define the following settings:

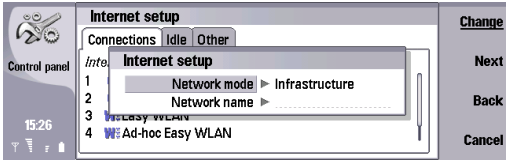
- *Internet settings name* — Type any name you want for the IAP; "Operator X WLAN service", for example.
- *Network ID* — Select the network ID for the connection. In most cases this can be *Internet* (the other option is *Default GPRS network*, which you probably already have settings for).
- *Internet settings type* — Select *Wireless LAN*.




Press **Next** to proceed.

2 Define the following settings:

- *Network mode* — Select *Infrastructure* to be able to connect to WLAN networks through a WLAN access point. The other option is *Ad hoc*, which is discussed later in this chapter.
- *Network name* — Enter the exact (case sensitive) network name (SSID) of the WLAN network. The name must be exactly the same as in your Wi-Fi router. If you do not enter the SSID here, you are not able to connect to networks that use a hidden SSID.




Press **Next** to proceed.

3 Select the WLAN security mode. Nokia 9500 Communicator supports the following WLAN security modes:

- *None* — This security mode is commonly used with HTTP based logon. User authentication is performed at a higher layer using a HTML login page.
- *WEP* — This security mode is supported for compatibility with IEEE 802.11 Wired Equivalent Privacy (WEP) networks. Pre-configured static WEP keys are required for this mode. There are two notations in use in the WLAN industry for the WEP key length representation, which sometimes makes things a bit confusing. The reason is that WEP key has a 24 bit common part and some vendors count this as being part of the key length, while some vendors do not. Nokia uses the latter notation. Both notations are equivalent at WLAN protocol level and fully interoperable. Nokia 9500 Communicator supports 40 (64) bit, 104 (128) and 232 (256) bit WEP key lengths.

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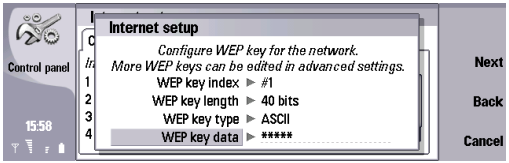
**Note:** The WEP mode provides a lower level of security than the Wi-Fi Protected Access (WPA) mode. If you use the WEP mode, you should change the key regularly.

When this security mode is selected and you press **Next**, the following dialog will be shown. Configure the WEP key by selecting its number, length and type and then entering the key.




**Note:** A WEP key can be entered in hexadecimal (HEX) or text (ASCII) format. It is important that the same notation is used both in the access point and the Nokia 9500 Communicator. A 104 bit WEP key is the same as a 128 bit WEP key, and you should enter 26 characters if you are using the HEX format, or 13 characters if you are using the ASCII format. Similarly, a 40 (64) bit WEP key requires 10 (HEX) or 5 (ASCII) characters, and a 232 (256) bit key requires 58 (HEX) or 29 (ASCII) characters.

- *802.1x* — This security mode is provided in order to support the legacy Dynamic WEP system, and to support networks that are migrating from Dynamic WEP to Wi-Fi Protected Access (WPA). In this mode, Nokia 9500 Communicator is able to join both dynamic WEP and WPA networks. Dynamic WEP refers to the fact that WEP keys are not static or pre-configured, but they are dynamically generated as part of the Extensible Authentication Protocol (EAP) authentication procedure. If WLAN access points support WPA, then it is recommended to use the WPA security mode instead of this mode.
- *WPA* — The Wi-Fi Protected Access (WPA) security mode provides the highest level of security among the WLAN security modes of Nokia 9500 Communicator. As required by the Wi-Fi specifications, WEP ciphering is not allowed in this mode, so Temporal Key Integrity Protection (TKIP) is used as the ciphering method.
  When this security mode is selected and you press **Next**, the following dialog will be shown. Select *EAP* in order to use Extensible Authentication Protocol (EAP) based logon, or select *Pre-shared key* to use a master password, which you must then enter.

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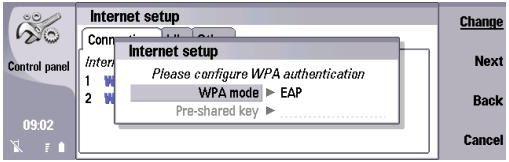
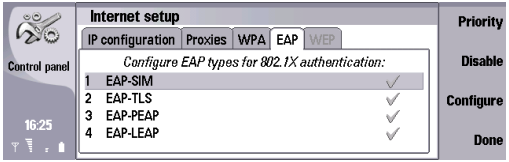
A WPA pre-shared key needs to be at least 8 characters long..




Press **Next** to proceed. If you do not need to configure any advanced settings, press **Finish** to save the settings of your new IAP. Otherwise, press **Advanced**.

**Note:** If you selected the 802.1x or the WPA/EAP security mode, you have to access the advanced settings to configure EAP settings.

4 In the advanced settings, press **Menu** to change to the *802.1x* page (in 802.1x mode) or *WPA* page (in WPA mode), and make sure that the WPA mode is set to *EAP*, as it should by default. This means that EAP based logon will be used.
Press **Menu** again to change to the *EAP* page and configure the EAP settings. Select the EAP methods that are allowed in this mode by moving up and down in the list and pressing *Disable* or *Enable*. Typically, the user uses only one EAP method, so in most cases only one EAP method should be enabled in this dialog.




5 In the advanced settings, press **Menu** to change to the *IP configuration* page and set the IP address and parameters, if necessary. In public wireless LAN networks DHCP is typically used, so the default value *Yes* for *Auto retrieve IP* should be used there. For the IPv6 DNS mode, you can select one of three alternatives: *DHCP*, *Manual* or *Well known*. If you select *Manual*, you need to type the IP addresses of the primary and secondary DNS servers.

6 In the advanced settings, press **Menu** to change to the *Proxies* page and configure the HTTP and HTTPS proxy settings, if necessary. If a web proxy needs to be used, select the protocol (HTTP or HTTPS), set *User proxy server* to *Yes*, type the IP address or domain name of the Proxy Server, type the *Port Number* (for example 8000 or 8080). You can use the *No proxy for* field to define the domains for which the HTTP or HTTPS proxy is not needed.

7 Press **Done** and press **Finish** to save the settings of your new IAP.

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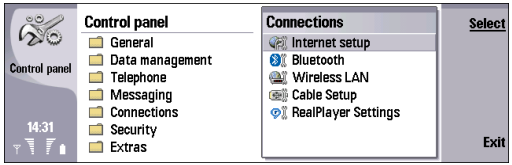
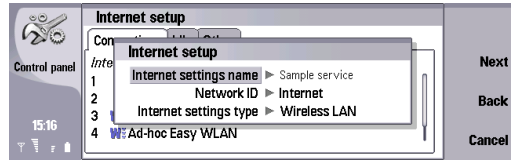
# Creating a WLAN Internet Access Point for an ad hoc network

To create a new Internet Access Point, select **Desk**→ **Tools**→ **Control Panel**→ **Connections**→ **Internet setup**.



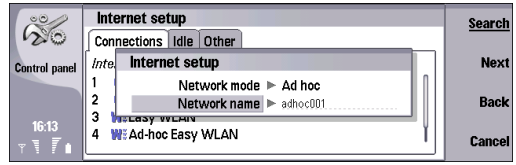

When the list of existing IAPs is shown, press **New** to create a new one. If there are existing IAPs, the setup asks you if you want to use of of them as a basis for the new IAP.

1 Define the following settings:
- *Internet settings name* — Type any descriptive name you want for the IAP; “Office ad hoc connection”, for example.
- *Network ID* — Select *Internet* as the network ID for the connection.
- *Internet settings type* — Select *Wireless LAN*.




Press **Next** to proceed.

2 Define the following settings:
- *Network mode* — Select *Ad hoc*.
- *Network name* — Give the network a name.




Press **Next** to proceed.

3 Select the WLAN security mode. Nokia 9500 Communicator supports the following WLAN security modes for ad hoc connections:
- *None*
- *WEP*— This security mode is supported for compatibility with IEEE 802.11 Wired Equivalent Privacy (WEP) networks. Pre-configured static WEP keys are required for this mode. There are two notations in use in the WLAN industry for the WEP key length representation, which sometimes makes

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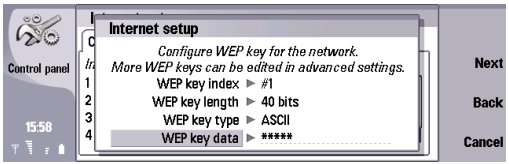
things a bit confusing. The reason is that WEP key has a 24 bit common part and some vendors count this as being part of the key length, while some vendors do not. Nokia uses the latter notation. Both notations are equivalent at WLAN protocol level and fully interoperable. Nokia 9500 Communicator supports 40 (64) bit, 104 (128) and 232 (256) bit WEP key lengths.

**Note:** The WEP mode provides a lower level of security than the Wi-Fi Protected Access (WPA) mode. If you use the WEP mode, you should change the key regularly.

When this security mode is selected and you press **Next**, the following dialog will be shown. Configure the WEP key by selecting its number, length and type and then entering the key.




**Note:** A WEP key can be entered in hexadecimal (HEX) or text (ASCII) format. It is important that the same notation is used both in the access point and the Nokia 9500 Communicator. A 104 bit WEP key is the same as a 128 bit WEP key, and you should enter 26 characters if you are using the HEX format, or 13 characters if you are using the ASCII format. Similarly, a 40 (64) bit WEP key requires 10 (HEX) or 5 (ASCII) characters, and a 232 (256) bit key requires 58 (HEX) or 29 (ASCII) characters.

Press **Next** to proceed. If you do not need to configure any advanced settings, press **Finish** to save the settings of your ad hoc IAP.

4 If you do need to configure advanced settings, press **Advanced**. On the *IP configuration* page, set the IP address and parameters, if necessary. In public wireless LAN networks DHCP is typically used, so the default value *Yes* for *Auto retrieve IP* should be used there. For the IPv6 DNS mode, you can select one of three alternatives: *DHCP*, *Manual* or *Well known*. If you select *Manual*, you need to type the IP addresses of the primary and secondary DNS servers.

5 Press **Menu** to change to the *Proxies* page and configure the HTTP and HTTPS proxy settings, if necessary. If a web proxy needs to be used, select the protocol (HTTP or HTTPS), set *User proxy server* to *Yes*,

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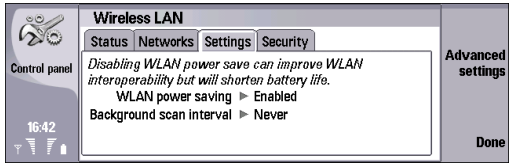
type the IP address or domain name of the Proxy Server, type the *Port Number* (for example 8000 or 8080). You can use the *No proxy for* field to define the domains for which the HTTP or HTTPS proxy is not needed.

6 Press **Done** and press **Finish** to save the settings of your ad hoc IAP.

## Defining general WLAN settings

To access the general settings, select **Desk**→ **Tools**→ **Control Panel**→ **Connections**→ **Wireless LAN**.




1 Press **Menu** to access the *Settings* page, where you can define the *Background scan interval*. If background scanning is enabled, the device will detect the availability of WLAN automatically. The availability of a WLAN network will be indicated in the user interface with a small "W" icon. If background scanning is disabled, then WLAN networks will only be scanned for when an application is establishing a connection to the Internet.

Change the *Background scan interval* to the desired value (*Never*, *1 minutes*, *2 minutes*, *5 minutes*, *10 minutes*). Selecting *Never* reduces battery consumption.

2 Next, select whether *WLAN power saving* is enabled or disabled. There are differences in the way WLAN access points implement WLAN power saving, which may lead to interoperability problems with your device when WLAN power saving is used. Disabling WLAN power saving increases power consumption when WLAN connections are used.

3 Press **Done** to save the settings.



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# Establishing a WLAN connection

This chapter describes how you can establish a WLAN connection. It uses a Web browser connection via the Easy WLAN IAP, which comes with the device, as an example, but other kinds of WLAN connections, such as an ad hoc connection to your printer, work the same way.

To establish a WLAN connection:

1. Make sure you have a valid user name and password for the network.
2. Switch on your Nokia 9500 Communicator.
3. Press **Web**, and select **Open Web address**.
4. Enter the URL of the Web page that you want to visit, and press **Go to**.
5. In the *Network connection* list, select *Easy WLAN*, and press **Connect**.
6. In the *WLAN selection* list, select the WLAN network, and press **Connect**.
7. When your browser is redirected to the authentication page, enter your user name and password, and press **OK**.

   You can now use the connection just like any other connection. If you experience problems with the WLAN connection, make sure that you are within the range of the access point.
8. When you are finished, press **Exit** to close the connection and the browser.

To close the connection, but leave the browser open, press **Menu**, and select *File*→ *Disconnect*.



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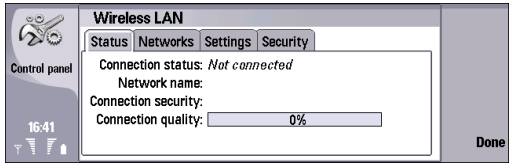
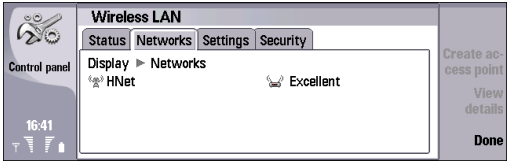
# Viewing the status of a WLAN connection

To view the status of your WLAN connection, select **Desk**→ **Tools**→ **Control Panel**→ **Connections**→ **Wireless LAN**.

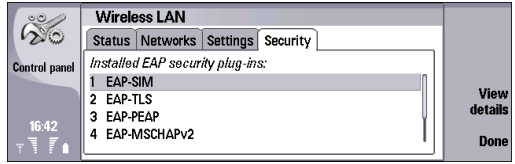



1 On the *Status* page you can see the connection status, network name, connection security and connection quality of the currently open WLAN connection.




2 Press **Menu** to change to the *Networks* page. In the *Display* field, select the network item you want, and press **View details** to view the following information:

- *Networks* – Select this to view all WLAN networks that can be accessed and their signal strength.
- *Access points* – Select this to view the wireless LAN access points that are currently in range and available, and the radio frequency channel they are using.
- *Ad hoc networks* – Select this to view the available ad hoc networks.




3 Press **Menu** to change to the *Security* page. Select an installed EAP security plug-in and press **View details** to view its name, release date, version and manufacturer.



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# WLAN troubleshooting

Some common problems that may occur when using WLAN are discussed in this section.

- **Wrong Bluetooth settings**: if you cannot browse the Web even though the WLAN connection is working, select **Desk**→ **Tools**→ **Control Panel**→ **Connections**→ **Wireless LAN**→ **Settings** and disallow *Simultaneous Bluetooth usage*, if it is allowed. Then you must remove the battery, reinsert it and switch on the device before browsing the Web again. This also turns off WLAN power saving in your device.
- **The WLAN icon sometimes appears different**: the WLAN network icon "W" in the upper left corner of the screen has the following implications for troubleshooting:

  **1** If the icon is not displayed at all, a WLAN connection has not been successfully established.

  **2** If the "W" icon is displayed and surrounded by a box graphic (see the image above) or a lock graphic (see the image below) but data cannot be transferred, the WLAN connection is working normally and the problem probably lies with TCP/IP.

  **3** If background scanning is turned on and the "W" icon is displayed without any border graphics (see the image below), it means that a WLAN network is available (that is, there is network coverage). It does not indicate that a WLAN connection is active and can be used to transfer data.

- **Wrong IP address**: if the "W" icon is displayed and surrounded by a box or lock graphic but data cannot be transferred, the IP address may be defined incorrectly. To check the IP address of your WLAN connection, select **Desk**→ **Tools**→ **Conn. manager**→ the **Menu** key and select select **Tools**→ **IP address**.

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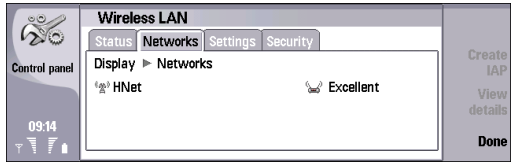
If DHCP is being used but it failed to retrieve the address, then an IP address starting with 169.254.x.x is shown. Sometimes it might take a while (up to 2 minutes) for Nokia 9500 Communicator to receive IP settings from the server.
If the IP addresses still appear incorrect, you can try the following two solutions:

1. Disable WLAN power saving. To access the setting, select **Desk**→ **Tools**→ **Control Panel**→ **Connections**→ **Wireless LAN**.
2. Try using manually configured IP settings instead of DHCP. Notice that this requires that you have acquired the appropriate IP settings for the particular network. You should request them from the network administrator.

- **Wrong proxy settings**: if you cannot browse the Web even though the WLAN connection is working and the IP settings seem to be correct, check that the HTTP/HTTPS proxy settings are defined correctly in the Internet Access Point settings.
- **Problems with the WEP security mode**: if you encounter these, check that the WEP keys have been entered in the correct format (ASCII vs. HEX) and have the right number of characters. ASCII WEP keys are also case sensitive; check that you have not confused any upper or lower case letters in the key.
  Incorrect WEP keys may cause a situation where Nokia 9500 Communicator is able to associate with a WLAN network (the "W" icon with a box graphic is visible) but no data can be transferred.
  Also remember to check that the WEP authentication mode is correct. In the access point it may be called, for example, "WEP authentication", "shared-key authentication" or "Wi-Fi security mode".
- **Poor signal quality**: to check the signal quality of your WLAN connection, select **Desk**→ **Tools**→ **Control Panel**→ **Connections**→ **Wireless LAN**→ **Networks**. If the signal quality is weak or even moderate, you may encounter connection problems. Try again nearer the access point.




- **Wrong security mode**: if the "W" icon is displayed but not surrounded by a box or lock graphic, the configured security mode may not be the right mode. To check the security mode that the network uses, select **Desk**→ **Tools**→ **Control Panel**→ **Connections**→ **Wireless LAN**→ **Networks**. Select the network and press **Details**.
- **Problems with the WPA or 802.1x security mode**: if you encounter these, check the following:
  1. Check that the WPA mode is the right one (pre-shared key or EAP).
  2. Check the pre-shared key.
  3. Check that all EAP types that are not needed are disabled.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4 Check that EAP type settings are correct (passwords, user names, certificates, etc.).

- **Problems with access point configuration**: if you encounter these, check the following:
  1 Many WLAN access points contain proprietary "Turbo" mode's claiming to enhance data rates. These functionalities should be disabled from the IAP if there is any reason to believe that they are causing problems to legacy WLAN terminals (including Nokia 9500 Communicator).
  2 Many access points contain an option to configure them for different wireless modes. These are usually called something like "802.11g Only", "802.11g Auto", "802.11b Only", "Mixed mode". If the IAP is configured to a "802.11g Only" mode it means that 802.11b devices (including Nokia 9500 Communicator) are not able to associate with the IAP.
  3 Many interoperability problems are solved by updating the IAP firmware to the latest version.
- **Finally...**: remember that all Wi-Fi certified devices are unfortunately not compatible, even if they are supposed to be.



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